

Course Title: Digital Signal Processing
Date: 1-12-2015 (Mid term exam)Course Code: CCE3116
Allowed time: 1.5 hrsYear: 3rd
No. of Pages: (1)Answer the following questions.**Problem number (1) (10 Marks)**(a) Consider the discrete-time sequence $x(n)$:

$$x(n) = \{2, 1, 1, 1, -1, -1, -2\}$$

↑

Sketch

- (i) $x(-n)$
- (ii) $x(n) u(n-2)$
- (iii) $x(2-n)$
- (iv) $x(-2-n)$

(b) State whether the following system are static, linear, shift invariant, causal, and stable or not.

- (i) $y_1(n) = x(n^2)$
- (ii) $y_2(n) = x^2(n)$
- (iii) $y_3(n) = 2^n \cdot x(n)$

Problem number (2) (6 Marks)

(a) Find the inverse Z-Transform of the following function:

$$X(z) = \frac{z+4}{(z-1)^2} + \frac{3}{z+1}$$

(b) Determine the 4-point DFT of the following discrete-time sequence:

$$x(n) = \{1, 0, 1, 0\}$$

Problem number (3) (4 Marks)Compute the circular convolution, $y(n) = x_1(n) \circledast x_2(n)$, where

$$x_1(n) = \{1, 1, 0, -1, 1\}$$

$$x_2(n) = \{1, 2, 2, 1, 1\}$$

Good luck

Dr. M. Arafa